

WHAT IS CLAIMED IS:

1. A method of screening a test agent for its ability to cause a thermodynamic change in a cell-free sample, comprising:
 - i) measuring the temperature of said sample using infrared thermography,
 - ii) contacting said sample with said test agent,
 - iii) measuring the temperature of said sample resulting from step (ii) using infrared thermography,
 - iv) comparing the temperature obtained in step (i) with the temperature obtained in step (iii),wherein a difference in temperature between that obtained in step (i) and that obtained in step (iii) indicates that said test agent causes a thermodynamic change in said sample.
2. The method according to claim 1 wherein said sample comprises an organic compound.
3. The method according to claim 2 wherein said sample further comprises an inorganic compound.
4. The method according to claim 2 wherein said organic compound is a protein, carbohydrate, lipid or nucleic acid.
5. The method according to claim 4 wherein said organic compound is a protein.

6. The method according to claim 5 wherein said protein is an enzyme.
7. The method according to claim 5 wherein said protein is a receptor.
8. The method according to claim 2 wherein when said test agent binds said organic compound, a thermodynamic change in said sample results.
9. The method according to claim 1 wherein said sample resulting from step (iii) contains both members of a binding pair.
10. The method according to claim 9 wherein said binding pair comprises an enzyme and a substrate therefor or a receptor and a ligand therefor.
11. The method according to claim 9 wherein when said test agent inhibits binding of said members of said binding pair, a difference in temperature between that obtained in step (i) and that obtained in step (iii) results, as compared to a test agent-free control wherein said members of said binding pair bind to each other.
12. The method according to claim 1 wherein step (iii) comprises measuring said temperature of said sample resulting from step (ii) at a multiplicity of time points, step (iv) comprises comparing the temperature

obtained in step (i) with the temperature obtained in step (iii) at each of said time points, wherein a difference in temperature between that obtained in step (i) and that obtained in step (iii) at at least one of said time points indicates that said test agent causes a thermodynamic change in said sample.

13. The method according to claim 1 wherein said measuring of steps (i) and (iii) is effected using infrared thermography at a specific wavelength or within a specific band of wavelengths.

14. The method according to claim 1 wherein said infrared thermography is infrared imaging thermography.

15. A method of screening a test agent for its ability to cause a thermodynamic change in an sample of cells *in vitro*, comprising:

- i) measuring the temperature of said sample using infrared thermography,
- ii) contacting said sample with said test agent,
- iii) measuring the temperature of said sample resulting from step (ii) using infrared thermography,
- iv) comparing the temperature obtained in step (i) with the temperature obtained in step (iii)

wherein a difference in temperature between that obtained in step (i) and that obtained in step (iii) indicates that said test agent causes a thermodynamic change in said sample.

16. The method according to claim 15 wherein said cells are cultured cells.
17. The method according to claim 15 wherein said cells are eucaryotic cells.
18. The method according to claim 17 wherein said cells are mammalian cells.
19. The method according to claim 18 wherein said cells are tumor cells.
20. The method according to claim 18 wherein said cells are adipocytes.
21. The method according to claim 15 wherein said cells are plant cells.
22. The method according to claim 17 wherein said cells are fungal cells.
23. The method according to claim 15 wherein said cells are engineered to contain a nucleic acid sequence encoding a heterologous protein or engineered to overexpress a protein endogenous to said cells.

24. The method according to claim 15 wherein said measuring of steps (i) and (iii) is effected using infrared thermography at a specific wavelength or within a specific band of wavelengths.

25. The method according to claim 15 wherein said infrared thermography is infrared imaging thermography.

26. The method according to claim 15 wherein step (iii) comprises measuring said temperature of said sample resulting from step (ii) at a multiplicity of time points, step (iv) comprises comparing the temperature obtained in step (i) with the temperature obtained in step (iii) at each of said time points, wherein a difference in temperature between that obtained in step (i) and that obtained in step (iii) at at least one of said time points indicates that said test agent causes a thermodynamic change in said sample.

27. The method according to claim 15 wherein said cells are engineered to contain a heterologous nucleic acid sequence.

28. A method of screening a test agent for its ability to cause a thermodynamic change in a sample comprising:

- i) measuring the temperature of a sample or portion thereof using infrared thermography,
- ii) contacting said sample, or portion thereof, with said test agent,

- iii) measuring the temperature of said sample or portion thereof resulting from step (ii) using infrared thermography,
- iv) repeating steps (i)-(iii) at least once,
- v) comparing the temperature obtained in step (i) with the temperatures obtained in steps (iii),

wherein a difference in temperature between that obtained in step (i) and that obtained in steps (iii) indicates that said test agent causes a thermodynamic change in said sample.

29. The method according to claim 28 wherein said sample is a cell-free sample.

30. The method according to claim 28 wherein said sample is a cell-containing sample.

31. The method according to claim 30 wherein said cells present in said sample are eucaryotic cells.

32. The method according to claim 31 wherein said cells are mammalian cells.

33. The method according to claim 32 wherein said cells are tumor cells.

34. The method according to claim 32 wherein said cells are adipocytes.

35. The method according to claim 30 wherein said cells are plant cells.

36. The method according to claim 30 wherein said cells are fungal cells.

37. The method according to claim 30 wherein said cells are engineered to contain a nucleic acid sequence encoding a heterologous protein or engineered to overexpress a protein endogenous to said cells.

38. The method according to claim 28 wherein said measuring of steps (i) and (iii) is effected using infrared thermography at a specific wavelength or within a specific band of wavelengths.

39. The method according to claim 28 wherein said infrared thermography is infrared imaging thermography.

40. The method according to claim 30 wherein said cells are engineered to contain a heterologous nucleic acid sequence.

41. The method according to claim 30 wherein said cells are present in a tissue.

42. The method according to claim 30 wherein said cells are present in an animal.

43. A method of screening a multiplicity of test agents for their ability to cause a thermodynamic change in a sample comprising:

- i) measuring the temperature of a sample or portion thereof using infrared thermography,
- ii) contacting said sample, or portion thereof, with said test agent,
- iii) measuring the temperature of said sample or portion thereof resulting from step (ii) using infrared thermography,
- iv) repeating steps (ii)-(iii) using a multiplicity of different test agents, individually,
- v) comparing the temperature obtained in step (i) with the temperatures obtained in steps (iii),

wherein a difference in temperature resulting from the addition of one of said test compounds to said sample or portion thereof indicates that said one of said test agents causes a thermodynamic change in said sample.

44. The method according to claim 43 wherein said sample is a cell-free sample.

45. The method according to claim 43 wherein said sample is a cell-containing sample.

46. The method according to claim 45 wherein said cells present in said sample are eucaryotic cells.

47. The method according to claim 46 wherein said cells are mammalian cells.

48. The method according to claim 47 wherein said cells are tumor cells.

49. The method according to claim 47 wherein said cells are adipocytes.

50. The method according to claim 45 wherein said cells are plant cells.

51. The method according to claim 46 wherein said cells are fungal cells.

52. The method according to claim 45 wherein said cells are engineered to contain a nucleic acid sequence encoding a heterologous protein or engineered to overexpress a protein endogenous to said cells.

53. The method according to claim 43 wherein said measuring of steps (i) and (iii) is effected using infrared thermography at a specific wavelength or with a specific band of wavelengths.

54. The method according to claim 43 wherein said infrared thermography is infrared imaging thermography.

55. The method according to claim 45 wherein said cells of said sample are present in a tissue.

56. The method according to claim 45 wherein said cells are present in an animal.

57. The method according to claim 45 wherein said cells are engineered to contain a heterologous nucleic acid.

58. A method of monitoring the physical state of a compound or composition comprising measuring the temperature of said compound or composition over time using infrared thermography.

59. The method according to claim 58 wherein said monitoring is effected as said compound or composition is changing from a gas to a liquid, or visa versa, from a liquid to a solid, or visa versa, or from a solid to a gas, or visa versa.

60. A method of determining the amount of a compound or composition present in a container comprising measuring the temperature of said compound or composition present in said container.

61. The method according to claim 60 wherein said compound or composition is a liquid.

62. The method according to claim 60 wherein said container is a multi-well microtiter plate.

63. A method of determining the thermogenic effect of a test agent on a sample comprising:

- i) contacting said sample, or portion thereof, with a first amount of said agent and measuring the resulting temperature using infrared thermography,
- ii) repeating step (i) at least once using a second, different, amount of said agent,

wherein a test agent that results in a thermogenic change in said sample at at least of said amounts is an agent that exerts a thermogenic effect on said sample.

64. The method according to claim 63 wherein said sample is a cell free sample.

65. The method according to claim 63 wherein said sample is a cell-containing sample.

66. The method according to claim 65 wherein said cells of said sample are present in an isolated tissue or are present in an animal.

67. A method of determining the thermogenic effect of a test agent on a sample comprising contacting said sample, or portion thereof, with said test agent and measuring the resulting temperature at a multiplicity of time points using infrared thermography,

wherein a test agent that causes a thermogenic change in said sample at at least one of said time points is an agent that exerts a thermogenic effect on said sample.

68. The method according to claim 67 wherein said sample is a cell free sample.

69. The method according to claim 67 wherein said sample is a cell-containing sample.

70. The method according to claim 69 wherein said cells of said sample are present in an isolated tissue ~~or are present in an animal.~~

71. A method of screening animals for their ability to respond thermogenically to a test agent in a desired manner comprising contacting said animals with said test agent and measuring the thermogenic response of said animals using infrared thermography and selecting from said animals those that have the desired thermogenic response.